UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : March 15, 2012

SUBJECT: Region III Data QA Review

FROM : Fred Foreman, Chief
OASQA Technical Services Branch

TO : Richard M. Fetzer,
Region 3 On-Scene Coordinator

Attached are the gas isotope data from the Dimock Residential Groundwater Site for samples collected January 25th thru January 27, 2012 and submitted to Isotech Laboratories Inc. for analysis. Due to the proprietary nature of the analytical method utilized by Isotech, we are unable to perform a validation of this data.

Samples submitted and analyzed are listed below:

HW02z	HW04	HW05	HW06
HW08a	HW12	HW17	HW24
HW02	HW01	HW14	HW19

Please contact me if you have any questions. I may be reached at 410-305-2629 or by email at foreman.fred@epa.gov

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Lab #:	235488	Job #:	17407
Sample Name/Number:	HW02z		
Company:	TechLaw, Inc.		
Date Sampled:	1/25/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	0.0112			
Hydrogen	nd			
Argon	0.628			
Oxygen	0.80			
Nitrogen	40.72			
Carbon Dioxide	0.094			
Methane	57.06	-29.30	-160.6	
Ethane	0.687			
Ethylene	nd			
Propane	nd			
Propylene	0.0001			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-64.6	-9.66

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 590

Specific gravity, calculated: 0.736

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235489	Job #:	17407
Sample Name/Number:	HW04		
Company:	TechLaw, Inc.		
Date Sampled:	1/24/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	1.50			
Oxygen	2.28			
Nitrogen	84.37			
Carbon Dioxide	2.01			
Methane	9.76	-24.98	-121.8	
Ethane	0.0796			
Ethylene	nd			
Propane	0.0004			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-63.2	-9.48

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 100 Specific gravity, calculated: 0.947

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.74
*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235490	Job #:	17407
Sample Name/Number:	HW05		
Company:	TechLaw, Inc.		
Date Sampled:	1/26/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	1.54			
Oxygen	4.82			
Nitrogen	84.97			
Carbon Dioxide	0.40			
Methane	8.24	-33.0	-162.9	
Ethane	0.0259			
Ethylene	nd			
Propane	nd			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-63.2	-9.36

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 84 Specific gravity, calculated: 0.948

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.68
*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.
** Methane carbon isotopes obtained online via GC-C-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235491	Job #:	17407
Sample Name/Number:	HW06		
Company:	TechLaw, Inc.		
Date Sampled:	1/26/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	0.0248			
Hydrogen	0.0222			
Argon	0.503			
Oxygen	1.04			
Nitrogen	32.03			
Carbon Dioxide	0.008			
Methane	65.62	-31.07	-169.0	
Ethane	0.746			
Ethylene	nd			
Propane	0.0068			
Propylene	0.0001			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-65.6	-9.85

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 678 Specific gravity, calculated: 0.700

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235492	Job #:	17407
Sample Name/Number:	HW08a		
Company:	TechLaw, Inc.		
Date Sampled:	1/25/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	0.746			
Oxygen	5.31			
Nitrogen	36.31			
Carbon Dioxide	3.22			
Methane	53.64	-36.58	-209.9	
Ethane	0.767			
Ethylene	nd			
Propane	0.0030			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-61.0	-9.20

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 557 Specific gravity, calculated: 0.774

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.67
*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235493	Job #:	17407
Sample Name/Number:	HW12		
Company:	TechLaw, Inc.		
Date Sampled:	1/26/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	0.0434			
Hydrogen	nd			
Argon	0.115			
Oxygen	0.16			
Nitrogen	4.54			
Carbon Dioxide	0.073			
Methane	94.06	-35.90	-196.7	
Ethane	0.987			
Ethylene	nd			
Propane	0.0221			
Propylene	0.0002			
Iso-butane	0.0006			
N-butane	0.0012			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-64.6	-9.60

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 972 Specific gravity, calculated: 0.580

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235494	Job #:	17407
Sample Name/Number:	HW17		
Company:	TechLaw, Inc.		
Date Sampled:	1/27/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	1.49			
Oxygen	2.06			
Nitrogen	80.93			
Carbon Dioxide	0.43			
Methane	14.97	-31.54	-167.8	
Ethane	0.118			
Ethylene	nd			
Propane	0.0011			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-64.9	-9.63

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 154 Specific gravity, calculated: 0.917

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.72
*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235495	Job #:	17407
Sample Name/Number:	HW24		
Company:	TechLaw, Inc.		
Date Sampled:	1/27/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	1.58			
Oxygen	1.29			
Nitrogen	94.00			
Carbon Dioxide	0.017			
Methane	3.11	-53.8	-165	
Ethane	nd			
Ethylene	nd			
Propane	nd			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-64.8	-9.70

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 31 Specific gravity, calculated: 0.963

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.65
*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.
** Methane isotopes obtained online via the GC-C-IRMS

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235496	Job #:	17407
Sample Name/Number:	HW02		
Company:	TechLaw, Inc.		
Date Sampled:	1/25/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	0.0110			
Hydrogen	nd			
Argon	0.636			
Oxygen	1.12			
Nitrogen	41.09			
Carbon Dioxide	0.10			
Methane	56.36	-29.36	-160.5	
Ethane	0.683			
Ethylene	nd			
Propane	nd			
Propylene	0.0001			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-64.5	-9.76

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 583 Specific gravity, calculated: 0.739

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235497	Job #:	17407
Sample Name/Number:	HW01		
Company:	TechLaw, Inc.		
Date Sampled:	1/25/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	0.0747			
Hydrogen	nd			
Argon	0.683			
Oxygen	0.20			
Nitrogen	49.91			
Carbon Dioxide	0.005			
Methane	48.69	-36.80	-202.4	
Ethane	0.432			
Ethylene	nd			
Propane	0.0004			
Propylene	0.0001			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-65.1	-9.81

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 501 Specific gravity, calculated: 0.769

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235498	Job #:	17407
Sample Name/Number:	HW14		
Company:	TechLaw, Inc.		
Date Sampled:	1/26/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	1.46			
Oxygen	2.70			
Nitrogen	72.02			
Carbon Dioxide	4.99			
Methane	18.74	-26.58	-140.3	
Ethane	0.0899			
Ethylene	nd			
Propane	nd			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-63.2	-9.54

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 191 Specific gravity, calculated: 0.927

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.74
*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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ANALYSIS REPORT

Lab #:	235499	Job #:	17407
Sample Name/Number:	HW19		
Company:	TechLaw, Inc.		
Date Sampled:	1/23/2012		
Container:	Dissolved Gas Bottle		
Field/Site Name:	A3TA		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	2/03/2012	Date Reported:	2/20/2012

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	$\delta^{18}O$ ‰
Carbon Monoxide	nd			
Hydrogen Sulfide	na			
Helium	na			
Hydrogen	nd			
Argon	1.63			
Oxygen	7.11			
Nitrogen	86.88			
Carbon Dioxide	4.38			
Methane	0.0011			
Ethane	nd			
Ethylene	nd			
Propane	nd			
Propylene	nd			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			
Water			-61.1	-9.13

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 0 Specific gravity, calculated: 1.008

Remarks:
Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.73
*Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Isotopic composition of oxygen is relative to VSMOW, except for carbon dioxide which is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

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www.isotechlabs.com

Isotech Gas Data

Job 17407

Isotech Lab No.	Sample Name	Sample Date	Sample Time	Field Name	GC Date	He %	H_2 %	Ar %	O_2 %	CO_2 %	N_2 %	CO %	C_1 %	C_2 %	C_2H_4 %	C_3 %	C_3H_6 %	iC_4 %	nC_4 %	iC_5 %	nC_5 %	C_6+ %	MS Date	$\delta^{13}C_1$ ‰	δDC_1 ‰	$\delta D\ H_2O$ ‰	$\delta^{18}O\ H_2O$ ‰	Specific Gravity	BTU	Helium dilution factor *
235488	HW02z	1/25/2012	12:59	A3TA	2/9/2012	0.0112	nd	0.628	0.80	0.094	40.72	nd	57.08	0.667	nd	nd	0.0001	nd	nd	nd	nd	nd	2/10/2012	-29.30	-160.6	-64.6	-9.66	0.736	590	
235489	HW04	1/24/2012	14:33	A3TA	2/9/2012	na	nd	1.50	2.28	2.01	84.37	nd	9.76	0.0796	nd	0.0004	nd	nd	nd	nd	nd	nd	2/10/2012	-24.98	-121.8	-63.2	-9.48	0.647	100	0.74
235490	HW05	1/26/2012	11:35	A3TA	2/9/2012	na	nd	1.54	4.62	0.40	84.97	nd	8.24	0.0259	nd	nd	nd	nd	nd	nd	nd	nd	2/13/2012	-33.0	-162.9	-63.2	-9.36	0.648	84	0.68
235491	HW06	1/26/2012	15:30	A3TA	2/9/2012	0.0248	0.0222	0.503	1.04	0.008	32.03	nd	65.62	0.746	nd	0.0068	0.0001	nd	nd	nd	nd	nd	2/11/2012	-31.07	-169.0	-65.6	-9.85	0.700	678	
235492	HW08a	1/25/2012	11:46	A3TA	2/9/2012	na	nd	0.746	5.31	3.22	36.31	nd	53.64	0.767	nd	0.0030	nd	nd	nd	nd	nd	nd	2/11/2012	-36.58	-209.9	-61.0	-9.20	0.774	557	0.67
235493	HW12	1/26/2012	13:23	A3TA	2/9/2012	0.0434	nd	0.115	0.16	0.073	4.54	nd	94.06	0.987	nd	0.0221	0.0002	0.0006	0.0012	nd	nd	nd	2/11/2012	-35.90	-196.7	-64.6	-9.60	0.580	972	
235494	HW17	1/27/2012	11:40	A3TA	2/9/2012	na	nd	1.49	2.06	0.43	80.93	nd	14.97	0.118	nd	0.0011	nd	nd	nd	nd	nd	nd	2/11/2012	-31.54	-167.8	-64.9	-9.63	0.917	154	0.72
235495	HW24	1/27/2012	12:09	A3TA	2/9/2012	na	nd	1.58	1.29	0.017	94.00	nd	3.11	nd	nd	nd	nd	nd	nd	nd	nd	nd	2/13/2012	-53.8	165	-64.8	-9.70	0.963	31	0.65
235496	HW02	1/25/2012	12:58	A3TA	2/9/2012	0.0110	nd	0.636	1.12	0.10	41.09	nd	56.36	0.683	nd	nd	0.0001	nd	nd	nd	nd	nd	2/11/2012	-29.36	-160.5	-64.5	-9.76	0.739	583	
235497	HW01	1/25/2012	16:31	A3TA	2/9/2012	0.0747	nd	0.683	0.20	0.005	49.91	nd	48.69	0.432	nd	0.0004	0.0001	nd	nd	nd	nd	nd	2/11/2012	-36.80	-202.4	-65.1	-9.81	0.769	501	
235498	HW14	1/26/2012	17:13	A3TA	2/9/2012	na	nd	1.46	2.70	4.99	72.02	nd	18.74	0.0899	nd	nd	nd	nd	nd	nd	nd	nd	2/11/2012	-26.58	-140.3	-63.2	-9.54	0.927	191	0.74
235499	HW19	1/23/2012	15:47	A3TA	2/9/2012	na	nd	1.63	7.11	4.38	86.88	nd	0.0011	nd	nd	nd	nd	nd	nd	nd	nd	nd	2/7/2012	*	*	-61.1	-9.13	1.008	0	0.73

* Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace.

Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

** *Isotopes obtained online via GC-C-IRMS*

*** Methane concentration insufficient for isotope analyses.

nd = not detected, na = not analyzed